

ABSTRACT OF THE DISCLOSURE

A method to make libraries of hybrid polynucleotide molecules of two parental polynucleotide molecules utilizing single-stranded DNA was invented. Example of the method comprises several steps: (i) preparation of two single-stranded polynucleotide molecules comprising sequences containing one or more parts of homology and one or more parts of heterology, (ii) random or non-random fragmentation of said polynucleotides, (iii) hybridization of the fragmented molecules followed by *de novo* polynucleotide synthesis (i.e. polynucleotide chain elongation) on the hybridized molecules, (iv) separation of the chain elongation products (i.e. double-stranded polynucleotide molecules) into single-stranded polynucleotide molecules (denaturation) (v) hybridization of the resultant single-stranded polynucleotide molecules followed by *de novo* polynucleotide synthesis on the hybridized molecules, and (vi) repeating at least two further cycles of steps (iv) and (v).